

WHAT IS CLAIMED IS:

1 1. An electronic device comprising:
2 a first circuit portion; and
3 a linear regulator circuit connected to said first circuit portion, said linear
4 regulator circuit comprising:
5 a circuit control node;
6 a circuit output node to which a load can be connected, a voltage at
7 said circuit output node being determined based on a voltage signal at said circuit
8 control node;
9 an amplifier circuit having a first amplifier input and a second
10 amplifier input, and further having an amplifier output, said first amplifier input
11 configured for receiving a reference voltage, said amplifier circuit receiving power
12 from a first voltage source;
13 a source follower circuit having a source follower input node and a
14 source follower output, said amplifier output configured to drive said source follower
15 input node, said source follower output coupled to said circuit control node; and
16 a feedback circuit coupled between said circuit output node and said
17 second amplifier input.

1 2. The electronic device of claim 1 wherein said electronic device is a
2 hard disk device.

1 3. The electronic device of claim 2 wherein said first circuit portion is a
2 hard disk device controller.

1 4. The electronic device of claim 1 further comprising a current mirror
2 circuit coupled between said amplifier output and said source follower.

1 5. The electronic device of claim 4 further comprising a resistor
2 component coupled between a second voltage source and said source follower input node.

1 6. The electronic device of claim 5 wherein said first voltage source is
2 different from the second voltage source.

1 7. The electronic device of claim 1 wherein said source follower circuit
2 comprises a transistor element in series connection with a current source.

1 8. The electronic device of claim 1 wherein said amplifier circuit
2 comprises a single op amp component.

1 9. The electronic device of claim 1 wherein said feedback path comprises
2 a pair of resistor components configured as a voltage divider.

1 10. The electronic device of claim 1 wherein a pass element having a
2 control node can be connected to said circuit control node, wherein a output node of said
3 pass element can be connected to said circuit output node, whereby said pass element can
4 provide a regulated output voltage at its output node to a load connected thereto.

1 11. The electronic device of claim 10 wherein a second voltage source
2 different from said first voltage source can be connected to said load via said pass element,
3 thereby providing a voltage to said load that is independent of said first voltage source.

1 12. A hard disk controller circuit comprising:
2 a first circuit node;
3 a second circuit node, wherein a voltage level thereat varies in accordance
4 with a voltage level of said first circuit node;
5 an error amplifier having a first amplifier input configured to be coupled to a
6 reference voltage, having a second amplifier input, and having an amplifier output, said error
7 amplifier configured to receive power from a first voltage source;
8 a gain stage comprising a source follower circuit in electrical communication
9 with said amplifier output and with said first circuit node;
10 a feedback path coupled between said second node and said second circuit
11 amplifier input, said feedback path including a pair of resistors configured as a voltage
12 divider.

1 13. The circuit of claim 12 wherein a pass element having a control node
2 an can be connected to said first circuit node, wherein a output node of said pass element can
3 be connected to said second circuit node, whereby said pass element can provide a regulated
4 output voltage at its output node to a load connected thereto.

1 14. The circuit of claim 13 wherein a second voltage source different from
2 said first voltage source can be connected to said load via said pass element, thereby
3 providing a voltage to said load that is independent of said first voltage source.

1 15. The circuit of claim 12 wherein said gain stage comprises a first
2 transistor component in series with a current source and having a control terminal, said
3 amplifier output configured to drive said control terminal.

1 16. The circuit of claim 15 further comprising a resistor component
2 coupled between a second voltage source and said control terminal.

1 17. The circuit of claim 16 wherein said first voltage source and said
2 second voltage source are the same.

1 18. The circuit of claim 16 wherein said first voltage source and said
2 second voltage source are different.

1 19. In a hard disk drive device, a method for regulating an output voltage
2 level suitable for supplying power to a first circuit comprising:
3 detecting said output voltage level;
4 producing an error signal based on a comparison of said output voltage level
5 relative to a reference voltage;
6 controlling a source follower circuit with said error signal to produce a source
7 follower output; and
8 varying said output voltage level based on said source follower output,
9 wherein a bandwidth at said output node has a pole at a frequency greater than
10 the unity gain frequency of said circuit.

1 20. The method of claim 19 wherein said first circuit is a hard disk
2 controller.

1 21. The method of claim 19 further comprising setting a DC operating
2 point of said source follower circuit via a resistor element coupled to a first voltage source.

1 22. The method of claim 21 further comprising controlling a pass circuit
2 with said source follower output to produce said output voltage level.

1 23. The method of claim 22 wherein controlling said pass circuit with
2 includes applying said source follower output to a control node of said pass circuit, said pass
3 circuit being powered by a second voltage source, wherein a pole at said control node of said
4 pass circuit varies with a pole at said circuit output node.

1 24. The method of claim 23 wherein said first voltage level is different
2 from said second voltage level.

1 25. A hard disk drive device having a hard disk controller, said hard disk
2 controller including a voltage regulator circuit comprising:

3 first means for detecting said output voltage level;

4 second means for producing an error signal based on a comparison of said
5 output voltage level relative to a reference voltage, said second means couple to a first
6 voltage source; and

7 a source follower circuit in electrical communication with said first means to
8 produce a source follower output,

9 wherein said output voltage level is varied in response to variances in said
10 source follower output,

11 wherein a bandwidth at said output node has a pole at a frequency greater than
12 the unity gain frequency of said circuit.

1 26. The circuit of claim 25 wherein said source follower output can be
2 connected to a pass element that is connected to a second voltage source, wherein an output
3 of said pass element constitutes said output voltage.

1 27. The circuit of claim 25 further comprising a resistor component
2 connected between said first voltage source and said source follower circuit.